IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A crystallization apparatus, which includes an illumination system that illuminates a phase shift mask to irradiate a polycrystalline semiconductor film or an amorphous semiconductor film with a light beam that has a light intensity distribution of an inverse peak pattern that has a minimum light intensity in an area corresponding to a phase shift portion of the phase shift mask to produce a crystallized semiconductor film, comprising:

an optical member to form on a predetermined plane a light intensity distribution of a concave pattern, which has a light intensity that is minimum in an area corresponding to the phase shift portion and increases toward the circumference of that area to a maximum based on the light from the illumination system, the phase shift mask receiving the light intensity distribution from the optical member; and

an image-forming optical system to set a surface of the polycrystalline semiconductor film or the amorphous semiconductor film or its conjugate plane and the predetermined plane to an optical conjugate relationship.

Claim 2 (Original): The crystallization apparatus according to claim 1, wherein the optical member has a transmission type amplitude modulation mask having a transmittance distribution according to the light intensity distribution having the concave pattern to be formed on the predetermined plane.

Claim 3 (Original): The crystallization apparatus according to claim 2, wherein the transmission type amplitude modulation mask has a light transmission portion having a fixed

thickness, and a light absorption portion having a thickness distribution according to the light intensity distribution having the concave pattern to be formed on the predetermined plane.

Claim 4 (Original): The crystallization apparatus according to claim 3, wherein the light absorption portion has a sinusoidal surface.

Claim 5 (Original): The crystallization apparatus according to claim 4, wherein the sinusoidal surface is formed into a continuously curved shape or a step-like shape.

Claim 6 (Original): The crystallization apparatus according to claim 1, wherein the optical member is an open type amplitude modulation mask having a numerical aperture distribution according to the light intensity distribution having the concave pattern to be formed on the predetermined plane.

Claim 7 (Original): The crystallization apparatus according to claim 6, wherein the open type amplitude modulation mask has many minute transmission areas or many minute light shielding areas or both.

Claim 8 (Original): The crystallization apparatus according to claim 7, wherein sizes of the minute transmission area and the minute light shielding area are set to be substantially smaller than a resolution of the image forming optical system.

Claim 9 (Original): The crystallization apparatus according to claim 8, wherein the image-forming optical system is a reduction optical system.

Claim 10 (Original): The crystallization apparatus according to claim 1, wherein, on the predetermined plane, the optical member is a converging/diverging element that produces an area that is illuminated with a part of the light beam is diverged in accordance with the phase shift portion and an area that is illuminated with a part of the light beam is converged in accordance with the circumference of the phase shift portion.

Claim 11 (Original): The crystallization apparatus according to claim 10, wherein the converging/diverging element has a diverging refraction surface to diverge a part of the light beam and a converging refraction surface to converge a part of the light beam.

Claim 12 (Original): The crystallization apparatus according to claim 11, wherein the diverging refraction surface and the converging refraction surface form a sinusoidal refraction surface.

Claim 13 (Original): The crystallization apparatus according to claim 12, wherein the sinusoidal refraction surface is formed into a continuous curved shape or a step-like shape.

Claim 14 (Original): The crystallization apparatus according to claim 1, wherein the optical member comprises a light intensity distribution formation element to form a predetermined light intensity distribution having a light intensity that is larger at the circumference rather than a center on a pupil plane of the illumination system or in the vicinity thereof, and a wavefront splitting element to wavefront-split a light beam supplied from the illumination system into a plurality of light beams and converge each wavefront-

split light beam in an area corresponding to the phase shift portion on the predetermined plane.

Claim 15 (Original): The crystallization apparatus according to claim 14, wherein the wavefront splitting element has a plurality of optical elements having a converging function.

Claim 16 (Original): The crystallization apparatus according to claim 14 or claim 15, wherein the predetermined light intensity distribution has a circular central area, which has a relatively small light intensity, and a toric peripheral area, which is formed so as to surround the central area and has a relatively large light intensity.

Claim 17 (Original): The crystallization apparatus according to claim 14 or claim 15, wherein the predetermined light intensity distribution has a central area, which is elongated along a predetermined direction and has a relatively small light intensity, and a peripheral area, which is formed so as to surround or sandwich the central area and has a relatively large light intensity.

Claim 18 (Original): The crystallization apparatus according to claim 14, wherein the light intensity distribution formation element has a transmission filter having a predetermined light transmittance distribution, which is arranged on the illumination pupil plane or in the vicinity thereof.

Claim 19 (Original): The crystallization apparatus according to claim 1, wherein a phase shift surface of the phase shift mask is formed on a surface on a side opposite to the illumination system side.

Claim 20 (Original): The crystallization apparatus according to claim 1, wherein the light intensity distribution that is applied to the polycrystalline semiconductor film or the amorphous semiconductor film has an inverse peak pattern area that has a minimum light intensity in an area corresponding to the phase shift portion of the phase shift mask, and a concave pattern area, which has the light intensity increases from the inverse peak pattern area toward the circumference, and has an inflection point where an inclination decreases toward the circumference between the inverse peak pattern area and the concave pattern area.

Claim 21 (Original): The crystallization apparatus according to claim 1, wherein the polycrystalline semiconductor film or the amorphous semiconductor film and the phase shift mask are arranged parallel to each other and in close proximity to each other.

Claim 22 (Original): The crystallization apparatus according to claim 1, further comprising a second image-forming optical system arranged in a light path between the polycrystalline semiconductor film or the amorphous semiconductor film and the phase shift mask,

wherein a surface of the polycrystalline semiconductor film or the amorphous semiconductor film is set apart from a plane that is optically conjugate with the phase shift mask through the second image-forming optical system along an optical axis by a predetermined distance.

Claim 23 (Original): The crystallization apparatus according to claim 1, further comprising a second image-forming optical system arranged in a light path between the polycrystalline semiconductor film or the amorphous semiconductor film and the phase shift mask,

wherein a surface of the polycrystalline semiconductor film or the amorphous semiconductor film is set to a plane optically conjugate with the phase shift mask through the second image-forming optical system, and

an image side numerical aperture of the second image-forming optical system is set to a value required to generate the light intensity distribution having the inverse peak pattern.

Claim 24 (Currently Amended): A crystallization method, which illuminates a phase shift mask to irradiate a polycrystalline semiconductor film or an amorphous semiconductor film with a light beam that has a light intensity distribution of an inverse peak pattern, which has a light intensity that is minimum in an area corresponding to a phase shift portion of the phase shift mask to produce a crystallized semiconductor film, comprising:

forming on a predetermined plane a light intensity distribution having a concave pattern that has a light intensity that becomes minimum in an area corresponding to the phase shift portion and increases toward the circumference of that area to a maximum based on the light from the illumination system, the phase shift mask receiving the light intensity distribution from the optical member; and

setting a surface of the polycrystalline semiconductor film or the amorphous semiconductor film or its conjugate plane and the predetermined plane to an optically conjugate relationship through the image-forming optical system.

Claim 25 (Original): The crystallization method according to claim 24, wherein the polycrystalline semiconductor film or the amorphous semiconductor film and the phase shift mask are arranged parallel to each other and in close proximity to each other.

Claim 26 (Original): The crystallization method according to claim 24, wherein a second image-forming optical system is arranged in a light path between the polycrystalline semiconductor film or the amorphous semiconductor film and the phase shift mask, and

a surface of the polycrystalline semiconductor film or the amorphous semiconductor film is set apart from a plane that is optically conjugate with the phase shift mask along an optical axis by a predetermined distance.

Claim 27 (Original): The crystallization method according to claim 24, wherein a second image-forming optical system is arranged in a light path between the polycrystalline semiconductor film or the amorphous semiconductor film and the phase shift mask,

an image side numerical aperture of the second image-forming optical system is set to a value required to generate the light intensity distribution having the inverse peak pattern, and

the surface of the polycrystalline semiconductor film or the amorphous semiconductor film is set to a plane that is optically conjugate with the phase shift mask through the second image-forming optical system.

Claim 28 (Original): A thin film transistor manufactured by the crystallization method according to claim 24.

Claim 29 (Original): A display apparatus including the thin film transistor according to claim 28.

Claim 30 (Currently Amended): A crystallization apparatus, which includes an illumination system that illuminates a phase shift mask to irradiate a polycrystalline semiconductor film or an amorphous semiconductor film with a light beam that has a light intensity distribution of an inverse peak pattern that has a minimum light intensity in an area corresponding to a phase shift portion of the phase shift mask to produce a crystallized semiconductor film, comprising:

an optical member to form on a predetermined plane a light intensity distribution of a concave pattern, which has a light intensity that is minimum at the center and increases toward the circumference to a maximum based on the light from the illumination system, the phase shift mask receiving the light intensity distribution from the optical member; and

an image-forming optical system to set a surface of the polycrystalline semiconductor film or the amorphous semiconductor film or its conjugate plane and the predetermined plane to an optical conjugate relationship.

Claim 31 (Currently Amended): A crystallization method, which illuminates a phase shift mask to irradiate a polycrystalline semiconductor film or an amorphous semiconductor film with a light beam that has a light intensity distribution of an inverse peak pattern, which has a light intensity that is minimum in an area corresponding to a phase shift portion of the phase shift mask to produce a crystallized semiconductor film, comprising:

forming on a predetermined plane a light intensity distribution having a concave pattern that has a light intensity that is minimum at the center and increases toward the

circumference based on the light from the illumination system, the phase shift mask receiving the light intensity distribution from the optical member; and

setting a surface of the polycrystalline semiconductor film or the amorphous semiconductor film or its conjugate plane and the predetermined plane to an optically conjugate relationship through the image-forming optical system.